

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2004/004011

International filing date (day/month/year)
11.02.2004

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC
C10G29/20, C10L1/22, C10L1/18

Applicant
BAKER HUGHES INCORPORATED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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Name and mailing address of the ISA:



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10/588341

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/004011

IP20 REC'D PCT/US 03 AUG 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/004011

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. ☐ It has not been possible to consider the validity of the priority claim because a copy of the priority document was not available to the ISA at the time that the search was conducted (Rule 17.1). This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

4. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3,10,12,13,15,16-25
	No: Claims	1,2,4-9,11,14
Inventive step (IS)	Yes: Claims	16-25
	No: Claims	1-15
Industrial applicability (IA)	Yes: Claims	1-25
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.
PCT/US2004/004011
AP20 Rec'd PCT 20 03 AUG 2006

Re Item V.

- 1 The following documents are referred to in this communication:
D1 : US 4 734 525 A (GREEN MICHAEL J) 29 March 1988 (1988-03-29)
D2: WO 98/02501 A (BAKER HUGHES INC) 22 January 1998 (1998-01-22)

Taking into account the conclusions of Point VIII below, the search and examination have been limited to mixtures of following compounds:

Compound (A) :

1,4-diazabicyclo(2.2.2)octane, 1,8-diazabicyclo(5.4.0)undec-7-ene,
1,5-diazabicyclo(4.3.0)non-5-ene and mixtures thereof

Compound (B) : epoxides.

2 INDEPENDENT CLAIM 1

- 2.1 The subject-matter of independent claim 1 is not new in the sense of Article 33(2) PCT, and therefore the criteria of Article 33(1) PCT are not met.

Ex. 1-3 and 5-8 of Document D1 disclose compositions comprising
1,8-diazabicyclo(5.4.0)undec-7-ene and 1,5-diazabicyclo(4.3.0)non-5-ene in
mixture with propylene oxide and butene oxide.

Dependent claims 2-15 do not contain any features which, in combination with the features of claim 1 meet the requirements of the PCT in respect of novelty and/or inventive step.

3 INDEPENDENT CLAIMS 16 AND 23

- 3.1 The document D2 is regarded as being the closest prior art to the subject-matter of claims 16 and 23, and shows (see p. 3 l.9-14 and cl. 1,3 of D2) the use of bisoxazolidine in a method of reducing the concentration of mercaptans in a hydrocarbon.

The subject-matter of claims 16 and 23 differs from this known method in that

another compound is used to this effect.

The subject-matter of claims 16 and 23 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as how to provide an alternative to the process of reducing the concentration of mercaptans in hydrocarbons.

The solution to this problem proposed in claims 16 and 23 of the present application is considered as involving an inventive step (Article 33(3) PCT) because none of the documents of the prior art on file discloses the use of diazabicyclo compounds in mixture with epoxides for reducing the concentration of mercaptans in hydrocarbons nor gives a hint to the effect of this use.

Claims 17-22, 24 and 25 are dependent on claims 16 or 23 and as such also meet/s the requirements of the PCT with respect to novelty and inventive step.

Re Item VIII.

Present claims 1, 4, 16 and 23 relate to an extremely large number of possible compounds. Support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT is to be found, however, for only a very small proportion of the compounds claimed. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Consequently, the search has been carried out for those parts of the claims which appear to be supported and disclosed, namely those parts relating to the compounds :

Compound (A) :

1,4-diazabicyclo(2.2.2)octane, 1,8-diazabicyclo(5.4.0)undec-7-ene,
1,5-diazabicyclo(4.3.0)non-5-ene and mixtures thereof

Compound (B) : epoxides,

those compounds prepared in the examples and closely related homologous compounds.